

**RULES  
OF  
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
BUREAU OF ENVIRONMENT  
DIVISION OF AIR POLLUTION CONTROL**

**CHAPTER 1200-3-7  
PROCESS EMISSION STANDARDS**

**TABLE OF CONTENTS**

1200-3-7-.01 General Process Particulate Emission Standards Catalytic Cracking Units	1200-3-7-.07 General Provisions and Applicability for Process Gaseous Emission Standards
1200-3-7-.02 Choice of Particulate Emission Standards-- Existing Process	1200-3-7-.08 Specific Process
1200-3-7-.03 New Processes	1200-3-7-.09 Sulfuric Acid Mist
1200-3-7-.04 Limiting Allowable Emissions	1200-3-7-.10 Grain Loading Limit for Certain Existing Sources
1200-3-7-.05 Specific Process Emission Standards	1200-3-7-.11 Carbon Monoxide, Electric Arc Furnaces
1200-3-7-.06 Standards of Performance for New Stationary Sources	1200-3-7-.12 Carbon Monoxide, Catalytic Cracking Units

**1200-3-7-.01 GENERAL PROCESS PARTICULATE EMISSIONS STANDARDS.**

- (1) No person shall cause, suffer, allow, or permit particulate emissions in excess of the standards in this Chapter.
- (2) In any area where one or more sources are emitting particulates at rates in conformity with applicable maximum allowable emission rates and the ambient air quality standard for particulate matter is being exceeded, the Board shall be responsible for setting an appropriate emission standard for each source contributing to the particulate matter in the ambient air of the area, at such value as the Board may consider necessary to achieve the desired air quality.

Certain areas in the state have been identified as needing additional control beyond that required by this Chapter. These areas and the additional control requirements are stated in Chapter 1200-3-19.

- (3) The owner or operator of an existing process emission source proposing to make a modification of this source or to rebuild or to replace it shall only take such action if it will result in the source meeting the maximum allowable particulate emissions standard for a new process emission source.
- (4) Limiting the Effect of the Definition of Modification. For the purpose of determining the applicable particulate matter emission standards in this chapter, a change in fuel from natural gas, propane, butane, and/or fuel oil to any of these herein named fuels and any required alternations to existing fuel burning equipment to accommodate these fuels, shall not be considered a modification.
- (5) Upon mutual agreement of the owner or operator of any air contaminant source and the Technical Secretary, an emission limit more restrictive than that otherwise specified in this Chapter may be established. This emission shall be stated as a special condition for any permit or order issued concerning the source. Violation of this agreed to, more stringent emission standard is grounds for revocation of the issued permit and/or other enforcement measures provided for in the Tennessee Air Quality Act.

**Authority:** T.C.A. §§53-3412, 68-25-105 and 4-5-202. **Administrative History:** Original Rule certified June 7, 1974. Amendment filed May 17, 1978; effective June 16, 1978. Amendment filed February 5, 1979; effective March 21, 1979. Amendment filed September 21, 1988; effective November 6, 1988.

**1200-3-7-.02 CHOICE OF PARTICULATE EMISSION STANDARDS - EXISTING PROCESS.**

- (1) For any process emission source operating within the State of Tennessee, which was in operation or under construction prior to August 9, 1969, the allowable emission standard shall be obtained from either the diffusion equations presented in 1200-3-7-.02(3) below or the process weight table presented in 1200-3-7-.02(4) below. The owner or operator of such a process emission source shall make known, in writing, to the Technical Secretary by July 1, 1972, his choice of emission standard. If no choice is so indicated, the Technical Secretary shall designate the emission standard of 1200-3-7-.02(4) below as the applicable standard. The emission standard chosen, either by the owner or operator or by the Technical Secretary, must be attained on or before August 9, 1973.
- (2) For any process emission source operating within the State of Tennessee, construction of which began on or after August 9, 1969, and before June 7, 1974, the allowable emission standard shall be the diffusion equations presented in 1200-3-7-.02(3) below. This standard must have been attained at the time such process emission source first commenced operation. The owner or operator of such a source shall make known in writing to the Technical Secretary by July 1, 1972, whether he wishes to continue under the diffusion equations standard or to switch to the process weight table standard presented in 1200-3-7-.02(4). If no choice is so indicated, the Technical Secretary shall designate the emission standard of 1200-3-7-.02(4) below as the applicable standard. If the process weight table standard is chosen by such owner or operator or by the Technical Secretary, then such owner or operator shall have until August 9, 1973 to convert fully to the process weight table standard. It is expressly stipulated that in the interim period such a process emission source shall continue to observe the diffusion equations standard originally applicable.
- (3) For those owners or operators of process emission sources who elect to have their process emission regulated by diffusion equations, the maximum allowable particulate emissions from such sources shall be determined by the procedures defined in (a), (b), and (c) below.

- (a) Stack gas exit temperature less than 100°F (See Note)

$$Q = 3.02 \times 10^{-4} V_s h_s^2 (d_s/h_s)^{0.71}$$

- (b) Stack gas exit temperature of 125°F or greater (See Note)

1. Stacks less than 500 feet in height

$$Q = 0.2h_s (Q_T \times 0.02 \times (T_s - 60))^{0.25}$$

2. Stacks 500 feet in height and greater

$$Q = 0.3h_s (Q_T \times 0.02 \times (T_s - 60))^{0.25}$$

- (c) 1. For stack gas exit temperatures from 100°F to 124°F calculate allowable emissions as in (a) and either (b) 1., or (b) 2., depending upon stack height (using  $T_s$  of 125°F), and make linear interpolation based upon actual stack gas exit temperature.
2. The terms of the preceding equation shall have the following meaning and units:
  - (i)  $d_s$  - inside diameter or equivalent diameter of stack tip in feet
  - (ii)  $h_s$  - stack height in feet (Vertical distance above grade directly below tip of stack) equal to the height in existence or approved pursuant to (State) review as of January 31, 1972 except as follows:
    - (I) In cases where the actual height is less than that stated above, the actual height shall be used.

(Rule 1200-3-7-.02, continued)

- (II) In cases where the actual height is greater than that stated above, and the stack height increase was constructed (grading and pouring of concrete was done) prior to February 8, 1974, the actual height shall be used up to two and one half times the height of the facility it serves.
- (iii)  $Q$  - maximum allowable emission rate in pounds per hour
- (iv)  $Q_T$  - volume rate of stack gas flow in cubic feet per second calculated to 60°F.
- (v)  $T_s$  - temperature of stack gases at stack tip in F
- (vi)  $V_s$  - velocity of stack gases at stack tip in feet per second
- (vii) NOTE - In determining applicability of equations in this paragraph based upon the exit gas temperature, the actual exit gas temperature must equal or exceed the stated temperature during ninety (90) percent or more of the operating time.
- (4) For those owners or operators of process emissions sources who elect to have their process emissions regulated by the Process Weight Table, the maximum allowable particulate emissions from a process emission source shall be determined by Table 1.
- (5) Whichever standard is chosen, all sources at the same facility must be regulated by that standard.
- (6) The owner or operator of a facility having elected to be regulated under the diffusion equations in paragraph (3) of this rule may apply to the Technical Secretary for having said facilities regulated under the process weight table specified in paragraph (4) of this rule. Once said application is approved the facility cannot return to being regulated by the diffusion equations.

**Authority:** T.C.A. §§53-3412, 68-25-105 and 4-5-202. **Administrative History:** Original rule certified June 7, 1974. Amendment filed March 13, 1978; April 12, 1978.

### 1200-3-7-.03 NEW PROCESSES.

- (1) The allowable emission level of particulate matter from any process emission source beginning operation on or after April 3, 1972, shall be determined by Table 2.
- (2) Regardless of the specific emission standards for particulate matter in other places in these Regulations, the Board may require any new or modified air contaminant source constructing in a nonattainment area to apply best available control technology for control of particulate emissions as determined by the Technical Secretary at the time the application for the construction permit is approved.
- (3) Regardless of the specific emission standards contained in this Chapter a new or modified process emission source locating in or significantly impacting upon a nonattainment area shall comply with the provisions of 1200-3-9-.01(5) prior to receiving a construction permit.
- (4) Regardless of the specific emission standards contained in this Chapter, all sources identified in 1200-3-9-.01(4) of these regulations shall comply with the standards set pursuant to Chapter 1200-3-9.

**Authority:** T.C.A. §§53-3412, 68-25-105 and 4-5-202. **Administrative History:** Original Rule certified June 7, 1974. Amendment filed January 10, 1977; effective February 9, 1977. Amendment filed February 5, 1978; effective March 21, 1979. Amendment filed May 7, 1979; effective June 21, 1979.

TABLE 1      EXISTING PROCESS EMISSION SOURCES ALLOWABLE RATE OF EMISSION  
 BASED ON PROCESS WEIGHT RATE<sup>a</sup>

Process Weight Rate		Rate of Emission	Process Weight Rate		Rate of Emission
Lb/hr	Tons/Hr	Lb/hr	Lb/hr	Tons/hr	Lb/hr
100	0.05	0.551	16,000	8.00	16.5
200	0.10	0.877	18,000	9.00	17.9
400	0.20	1.40	20,000	10.00	19.2
600	0.30	1.83	30,000	15.	25.2
800	0.40	2.22	40,000	20.	30.5
1,000	0.50	2.58	50,000	25.	35.4
1,500	0.75	3.38	60,000	30.	40.0
2,000	1.00	4.10	70,000	35.	41.3
2,500	1.25	4.76	80,000	40.	42.5
3,000	1.50	5.38	90,000	45.	43.6
3,500	1.75	5.96	100,000	50.	44.6
4,000	2.00	6.52	120,000	60.	46.3
5,000	2.50	7.58	140,000	70.	47.8
6,000	3.00	8.56	160,000	80.	49.0
7,000	3.50	9.49	200,000	100.	51.3
8,000	4.00	10.4	1,000,000	500.	69.0
9,000	4.50	11.2	2,000,000	1,000.	77.6
10,000	5.00	12.0	6,000,000	3,000.	92.7
12,000	6.00	13.6			

<sup>a</sup> Interpolation of the data in this table for process weight rates up to 60,000 lb/hr shall be accomplished by using the equation  $E = 4.10 P^{0.67}$  and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation:

$$E = 55.0 P^{0.11} - 40, \text{ where } E = \text{rate of emission in lb/hr}$$

and  $P = \text{process weight rate in tons/hr.}$

TABLE 2 NEW PROCESS EMISSION SOURCES ALLOWABLE RATE OF EMISSION  
BASED OF PROCESS WEIGHT RATE<sup>a</sup>

Process Weight Rate		Rate of Emission	Process Weight Rate		Rate of Emission
Lb/Hr	Tons/Hr		Lb/hr	Tons/Hr	Lb/Hr
50	0.025	0.36	16,000	8.00	13.0
100	0.05	0.55	18,000	9.00	14.0
200	0.10	0.86	20,000	10.	15.0
400	0.20	1.32			
600	0.30	1.70	30,000	15.	19.2
800	0.40	2.03	40,000	20.	23.0
1,000	0.50	2.34	50,000	25.	26.4
1,500	0.75	3.00	60,000	30.	29.6
2,000	1.00	3.59	70,000	35.	30.6
2,500	1.25	4.12	80,000	40.	31.2
3,000	1.50	4.62	90,000	45.	31.8
3,500	1.75	5.08	100,000	50.	32.4
4,000	2.00	5.52	120,000	60.	33.3
5,000	2.50	6.34	140,000	70.	34.2
6,000	3.00	7.09	160,000	80.	34.9
7,000	3.50	7.81	200,000	100.	36.2
8,000	4.00	8.5	1,000,000	500	46.8
9,000	4.50	9.1			
10,000	5.00	9.7			
12,000	6.00	10.9			

<sup>a</sup> Interpolation of the data in Table 2 for the process weight rates up to 60,000 lbs/hr shall be accomplished by the use of the equation:

$$E = 3.59 P^{0.62} \text{ for } P \text{ less than or equal to } 30 \text{ tons/hr}$$

and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lbs/hr shall be accomplished by use of the equation:

$$E = 17.31 P^{0.16} \text{ for } P \text{ greater than } 30 \text{ tons/hr}$$

Where: E = Emissions in pounds per hour  
P = Process weight rate in tons per hour

**1200-3-7-.04 LIMITING ALLOWABLE EMISSIONS.**

- (1) Irrespective of the maximum allowable emission as determined by any of the preceding equations or Process Weight Tables in this chapter, the concentration of particulate process emissions shall not be required to be less than 0.02 grain per dry cubic foot of stack gases corrected to 70°F and 1 atmosphere unless a lesser concentration is found by the Board to be necessary.
- (2) Irrespective of the maximum allowable emission as determined by any of the preceding equations or Process Weight Tables in this chapter, the maximum allowable concentration of particulate process emissions shall be 0.25 grains per dry cubic foot of stack gases corrected to 70°F and 1 atmosphere. This shall be achieved by all air contaminant sources on or before August 9, 1973. Air contaminant sources constructed after August 9, 1969, shall meet the above emission standard when they commence operation. This paragraph shall not apply to vents from storage tanks for liquids.
- (3) Irrespective of the maximum allowable emission as determined by any of the preceding equations or Process Weight Tables in this chapter, the maximum allowable particulate emissions for processes which are relocated more than 1.0 km from the previous position after November 6, 1988, shall not exceed the greater of the actual emissions at its previous location or the allowable emissions for a new process source.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule certified June 7, 1974. Amendment effective March 21, 1979. Amendment filed September 21, 1988; effective November 6, 1988. Amendment filed May 17, 1990; effective July 1, 1990.

**1200-3-7-.05 SPECIFIC PROCESS EMISSION STANDARDS.**

The emission limits set forth in rules 1200-3-7-.02, .03, and .04 will apply unless a specific process emission standard for a specifically designated type of process emission source is contained in a subsequent rule of this chapter.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule certified June 7, 1974.

**1200-3-7-.06 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES.**

The Board shall from time to time, after public hearing, designate additional standard(s) of performance for new stationary sources as promulgated by the Environmental Protection Agency and published in the *Federal Register*.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule certified June 7, 1974.

**1200-3-7-.07 GENERAL PROVISIONS AND APPLICABILITY FOR PROCESS GASEOUS EMISSION STANDARDS.**

- (1) No person shall cause, suffer, allow, or permit gaseous emissions in excess of the standards in this chapter.
- (2) Any person constructing or otherwise establishing an air contaminant source emitting gaseous air contaminants after April 3, 1972, or relocating an air contaminant source more than 1.0 km from the previous position after November 6, 1988, shall install and utilize equipment and technology which is deemed reasonable and proper by the Technical Secretary.
- (3) (Reserved).
- (4) Total Reduced Sulfur Emissions from Kraft Mills. The owner or operator of a kraft mill constructed or modified prior to September 24, 1976, shall meet the emission standards listed in subparagraphs (a), (b), (c) and (d) of this paragraph no later than six years (i.e., January 22, 1988) for recovery furnaces;

(Rule 1200-3-7-.07, continued)

two years (i.e., January 22, 1984) for digesters, multiple effect evaporators, smelt dissolving tanks and four years (i.e., January 22, 1986) for lime kilns.

- (a) Total reduced sulfur emissions from the recovery furnace shall not exceed 20 ppm by volume, expressed as  $H_2S$ , on a dry basis, corrected to 8 percent oxygen on a 12-hour averaging basis.
- (b) Total reduced sulfur emissions from the lime kiln shall not exceed 20 ppm by volume, expressed as  $H_2S$  on a dry basis, corrected to 10 percent oxygen on a 12-hour averaging basis.
- (c) Total reduced sulfur emissions from any digester system or multiple effect evaporator system shall not exceed 5 ppm by volume, expressed as  $H_2S$ , on a dry basis, corrected to 10 percent oxygen on a 24-hour averaging basis.
- (d) Total reduced sulfur emissions from any smelt dissolving tank shall not exceed 0.0168 grams/kilogram black liquor solids on a 24-hour averaging basis. In lieu of meeting the emissions standard the use of fresh water on the particulate control system will be deemed as being in compliance.
- (e) The Technical Secretary will not consider periods of excess emissions to be indicative of a violation of the standards in this rule provided that:
  - 1. The percent of total number of possible contiguous periods of excess emissions in a quarter (excluding periods of startup, shutdown or malfunction) during which excess emissions occur does not exceed:
    - (i) One percent for TRS emissions from the recovery furnaces, or
    - (ii) Two percent for TRS emissions from lime kilns, and
  - 2. The Technical Secretary determines that the sources involved, including air pollution control equipment, are maintained and operated in a manner which is consistent with good air pollution control practice for minimizing emissions during periods of excess emissions.
- (5) Total Fluoride Emissions From Potrooms at Primary Aluminum Reduction Plants. The owner or operator of a primary aluminum reduction plant constructed or modified prior to October 23, 1974 shall meet the standards listed in paragraph (b) for a center worked pre baked operation or (c) for a side worked pre baked operation. Compliance with the applicable standard shall be attained in no later than three years except in such cases where the Board grants an extension of time. Such an extension shall not exceed eighteen months. A compliance schedule for meeting the applicable emission standard shall be filed by May 21, 1982.
  - (a) Said compliance schedule shall contain the following additional increments of progress:
    - 1. Date the contract will be awarded.
    - 2. Date initial construction will commence.
    - 3. Date constructed will be completed.
    - 4. Date final compliance will be achieved.
  - (b) Center Worked Pre-Bake Operations

(Rule 1200-3-7-.07, continued)

1. The primary collection system shall be designed to have an average collection efficiency of 95%. This determination shall be made by the Technical Secretary based on the design criteria provided by the source.
2. The system shall be maintained to assure operation at the efficiency required. Pot hood covers will be in good repair and properly positioned. When hood covers are removed for working of the pots, they will be replaced in a minimum amount of time. The removal system must be maintained on a regular basis in accordance with the program approved by the Technical Secretary.
3. The control system shall be designed to remove 98.5% of the fluorides collected and operate at a minimum removal efficiency of 95% of the fluorides collected. Compliance with this operational standard shall be determined by utilizing the test methods and procedures contained in 1200-3-12-.03(9).

(c) Side Worked Pre Bake Operations

1. The primary collection system shall be designed to have an average collection efficiency of 80%. This determination shall be made by the Technical Secretary based on the design criteria provided by the source.
2. The system shall be maintained to assure operation at the efficiency required. Pot hood covers will be in good repair and properly positioned. When hood covers are removed for working of the pots, they will be replaced in a minimum amount of time. The removal system must be maintained on a regular basis in accordance with the program approved by the Technical Secretary.
3. The control system shall be designed to remove 98.5% of the fluorides collected and operate at a minimum removal efficiency of 95% of the fluorides collected. Compliance with this operational standard shall be determined by utilizing the test methods and procedures contained in 1200-3-12-.03(9).

(6) Reserved.

- (7) Each municipal solid waste landfill for which construction, reconstruction or modification was commenced before May 30, 1991 that has accepted waste at any time since November 8, 1987 and each municipal solid waste landfill for which construction, reconstruction or modification was commenced before May 30, 1991 that has additional design capacity available for future waste deposition, shall satisfy the standards and requirements as follow:

- (a) For what follows, "Administrator" means the Technical Secretary of the Tennessee Air Pollution Control Board in those cases for which Authority to implement and enforce provisions of the rule have been delegated to Tennessee. Otherwise, "Administrator" means the Administrator of the United States Environmental Protection Agency. "State" means the State of Tennessee."
- (b) For the purpose of this paragraph, the definitions listed in 40 CFR Part 60 Subpart WWW, §60.751 apply.
- (c) All facilities subject to this paragraph shall comply with the provisions of 40 CFR Part 60 Subpart WWW, §§60.752 through 60.759, except as listed in Subparts (i) and (ii) of this subparagraph.



(Rule 1200-3-7-.07, continued)

1. The initial design capacity report required by §60.757 (a) shall be submitted no later than March 28, 1999. This submittal date shall replace the submittal dates listed in §60.757(a)(1)(i) through (iii).
  2. The initial NMOC emission rate report required by §60.757(b) shall be submitted with the initial design capacity report required under Subpart (i) of this subparagraph. The date for the submittal of the initial NMOC emission rate report as listed in §60.757(b)(1)(i) shall be replaced by the requirement to submit this report no later than March 28, 1999.
- (d) Adopted herein by reference are the Federal regulations in Paragraph (9) of this rule as appearing in Subpart WWW of 40 CFR Part 60. Source: (published in the Federal Register / Vol. 61, No. 49 / Tuesday, March 12, 1996 / Rules and Regulations 9919), unless otherwise noted.
- (8) Two typographical errors were found in the regulation as published in the Federal Register. Specifically in §60.753(g), a reference is made to §60.752(a)(3) through (5). This reference should be to §60.755(a)(3) through (5) where the referenced information is actually found in the regulation. Next, in §60.758(c)(1)(ii), the reference to “paragraph (b)(3)(i) of this section” should be to “paragraph (b)(3) of this section”, since no paragraph (b)(3)(i) exists.
- (9) Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills

Sec.

60.750	Applicability, designation of affected facility, and delegation of Authority.
60.751	Definitions.
60.752	Standards for air emissions from municipal solid waste landfills.
60.753	Operational standards for collection and control systems.
60.754	Test methods and procedures.
60.755	Compliance provisions.
60.756	Monitoring of operations.
60.757	Reporting requirements.
60.758	Recordkeeping requirements.
60.759	Specifications for active collection systems.

Authority: 42 U.S.C. 7401,7411, 7414, 7416 and 7601.

Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills

§60.750 Applicability, designation of affected facility, and delegation of Authority.

- (a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991. Physical or operational changes made to an existing MSW landfill solely to comply with Subpart Cc of this part are not considered construction, reconstruction, or modification for the purposes of this section.
- (b) The following authorities shall be retained by the Administrator and not transferred to the State: None.

§60.751 Definitions.

(Rule 1200-3-7-.07, continued)

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act or in subpart A of this part.

“Active collection system” means a gas collection system that uses gas mover equipment.

“Active landfill” means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

“Closed landfill” means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed. A landfill is considered closed after meeting the criteria of § 258.60 of this title.

“Closure” means that point in time when a landfill becomes a closed landfill.

“Commercial solid waste” means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

“Controlled landfill” means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time either (1) a notification of intent to install a collection and control system or (2) a collection and control system design plan is submitted in compliance with § 60.752(b)(2)(i).

“Design capacity” means the maximum amount of solid waste a landfill can accept, as specified in the construction or operating permit issued by the State, local, or Tribal agency responsible for regulating the landfill.

“Disposal facility” means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

“Emission rate cutoff” means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

“Enclosed combustor” means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

“Flare” means an open combustor without enclosure or shroud.

“Gas mover equipment” means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

“Household waste” means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

“Industrial solid waste” means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, §§ 264 and 265 of this title. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

(Rule 1200-3-7-.07, continued)

“Interior Well” means any well or similar collection component located inside the perimeter of the landfill. A perimeter well located outside the landfilled waste is not an interior well.

“Landfill” means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this title.

“Lateral expansion” means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

“Municipal solid waste landfill” or “MSW landfill” means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

“Municipal solid waste landfill emissions” or “MSW landfill emissions” means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

“NMOC” means nonmethane organic compounds, as measured according to the provisions of § 60.754.

“Nondegradable waste” means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

“Passive collection system” means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

“Sludge” means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

“Solid waste” means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

“Sufficient density” means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

“Sufficient extraction rate” means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

§60.752 Standards for air emissions from municipal solid waste landfills.

- (a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume shall submit an initial design capacity report to the

(Rule 1200-3-7-.07, continued)

Administrator as provided in § 60.757(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report. For purposes of part 70 permitting, a landfill with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under part 70 of this chapter. Submittal of the initial design capacity report shall fulfill the requirements of this subpart except as provided for in paragraphs (a)(1) and (a)(2) of this section.

- (1) The owner or operator shall submit to the Administrator an amended design capacity report, as provided for in § 60.757(a)(3), when there is any increase in the design capacity of a landfill subject to the provisions of this subpart, whether the increase results from an increase in the area or depth of the landfill, a change in the operating procedures of the landfill, or any other means.
  - (2) If any increase in the maximum design capacity of a landfill exempted from the provisions of § 60.752(b) through § 60.759 of this subpart on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, the owner or operator shall comply with the provision of paragraph (b) of this section.
- (b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, shall either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in § 60.754. The NMOC emission rate shall be recalculated annually, except as provided in § 60.757(b)(1)(ii) of this subpart. The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters is subject to part 70 permitting requirements. When a landfill is closed, and either never needed control or meets the conditions for control system removal specified in § 60.752(b)(2)(v) of this subpart, a part 70 operating permit is no longer required.
  - (1) If the calculated NMOC emission rate is less than 50 megagrams per year, the owner or operator shall:
    - (i) Submit an annual emission report to the Administrator, except as provided for in § 60.757(b)(1)(ii); and
    - (ii) Recalculate the NMOC emission rate annually using the procedures specified in § 60.754(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed.
      - (A) If the NMOC emission rate, upon recalculation required in paragraph (b)(1)(ii) of this section, is equal to or greater than 50 megagrams per year, the owner or operator shall install a collection and control system in compliance with paragraph (b)(2) of this section.
      - (B) If the landfill is permanently closed, a closure notification shall be submitted to the Administrator as provided for in § 60.757(d).
  - (2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall:

(Rule 1200-3-7-.07, continued)

- (i) Submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year:
  - (A) The collection and control system as described in the plan shall meet the design requirements of paragraph (b)(2)(ii) of this section.
  - (B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of §§ 60.753 through 60.758 proposed by the owner or operator.
  - (C) The collection and control system design plan shall either conform with specifications for active collection systems in § 60.759 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 60.759.
  - (D) The Administrator shall review the information submitted under paragraphs (b)(2)(i)(A),(B) and (C) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.
- (ii) Install a collection and control system within 18 months of the submittal of the design plan under paragraph (b)(2)(i) of this section that effectively captures the gas generated within the landfill.
  - (A) An active collection system shall:
    - (1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
    - (2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:
      - (i) 5 years or more if active; or
      - (ii) 2 years or more if closed or at final grade;
    - (3) Collect gas at a sufficient extraction rate;
    - (4) Be designed to minimize off-site migration of subsurface gas.
  - (B) A passive collection system shall:
    - (1) Comply with the provisions specified in paragraphs (A)(1),(2), and (4) of paragraph (b)(2)(ii) of this section.

(Rule 1200-3-7-.07, continued)

- (2) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners shall be installed as required under § 258.40 of this title.
  - (iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B) or (C) of this section.
    - (A) An open flare designed and operated in accordance with § 60.18;
    - (B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, required under § 60.8 using the test methods specified in § 60.754(d).
- (1) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.
- (2) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.756;
  - (C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.
- (iv) Operate the collection and control device installed to comply with this subpart in accordance with the provisions of § 60.753, 60.755 and 60.756.
- (v) The collection and control system may be capped or removed provided that all the conditions of paragraphs (b)(2)(v)(A), (B), and (C) of this section are met:
  - (A) The landfill shall be no longer accepting solid waste and be permanently closed under the requirements of § 258.60 of this title. A closure report shall be submitted to the Administrator as provided in § 60.757(d);
  - (B) The collection and control system shall have been in operation a minimum of 15 years; and
  - (C) Following the procedures specified in § 60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

§60.753 Operational standards for collection and control systems.

(Rule 1200-3-7-.07, continued)

Each owner or operator of an MSW landfill gas collection and control system used to comply with the provisions of § 60.752(b)(2)(ii) of this subpart shall:

- (a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:
  - (1) 5 years or more if active; or
  - (2) 2 years or more if closed or at final grade;
- (b) Operate the collection system with negative pressure at each wellhead except under the following conditions:
  - (1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in § 60.757(f)(1);
  - (2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;
  - (3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Administrator;
- (c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55°C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.
  - (1) The nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart.
  - (2) Unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A except that:
    - (i) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;
    - (ii) A data recorder is not required;
    - (iii) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;
    - (iv) A calibration error check is not required;
    - (v) The allowable sample bias, zero drift, and calibration drift are  $\pm 10$  percent.
- (d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A

(Rule 1200-3-7-.07, continued)

surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

- (e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour; and
- (f) Operate the control or treatment system at all times when the collected gas is routed to the system.
- (g) If monitoring demonstrates that the operational requirement in paragraphs (b), (c), or (d) of this section are not met, corrective action shall be taken as specified in § 60.752(a)(3) through (5) or § 60.755(c) of this subpart. If corrective actions are taken as specified in § 60.755, the monitored exceedance is not a violation of the operational requirements in this section.

#### §60.754 Test methods and procedures.

- (a) (1) The landfill owner or operator shall calculate the NMOC emission rate using either the equation provided in paragraph (a)(1)(i) of this section or the equation provided in paragraph (a)(1)(ii) of this section. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for  $L_o$ , and 4,000 parts per million by volume as hexane for the  $C_{NMOC}$ .

- (i) The following equation shall be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^n 2kL_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9})$$

where,

$M_{NMOC}$  = Total NMOC emission rate from the landfill, megagrams per year

k = methane generation rate constant, year<sup>-1</sup>

$L_o$  = methane generation potential, cubic meters per megagram solid waste

$M_i$  = mass of solid waste in the i<sup>th</sup> section, megagrams

$t_i$  = age of the i<sup>th</sup> section, years

$C_{NMOC}$  = concentration of NMOC, parts per million by volume as hexane

$3.6 \times 10^{-9}$  = conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for  $M_i$  if the documentation provisions of § 60.758(d)(2) are followed.

- (ii) The following equation shall be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{NMOC} = 2L_o R (e^{-k_c} - e^{-k_t}) (C_{NMOC}) (3.6 \times 10^{-9})$$

where,



(Rule 1200-3-7-.07, continued)

$M_{\text{NMOC}}$  = mass emission rate of NMOC, megagrams per year

$L_0$  = methane generation potential, cubic meters per megagram solid waste

$R$  = average annual acceptance rate, megagrams per year

$k$  = methane generation rate constant, year<sup>-1</sup>

$C_{\text{NMOC}}$  = concentration of NMOC, parts per million by volume as hexane

$c$  = time since closure, years. For active landfill  $c = 0$  and  $e^{-kc} = 1$

$3.6 \times 10^{-9}$  = conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for  $R$ , if the documentation provisions of § 60.758(d)(2) are followed.

- (2) Tier 1. The owner or operator shall compare the calculated NMOC mass emission rate to the standard of 50 megagrams per year.
  - (i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 50 megagrams per year, then the landfill owner shall submit an emission rate report as provided in § 60.757(b)(1), and shall recalculate the NMOC mass emission rate annually as required under § 60.752(b)(1).
  - (ii) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, then the landfill owner shall either comply with § 60.752(b)(2), or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in paragraph (a)(3) of this section.
- (3) Tier 2. The landfill owner or operator shall determine the NMOC concentration using the following sampling procedure. The landfill owner or operator shall install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C of appendix A of this part or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). If composite sampling is used, equal volumes shall be taken from each sample probe. If more than the required number of samples are taken, all samples shall be used in the analysis. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from  $C_{\text{NMOC}}$  as carbon to  $C_{\text{NMOC}}$  as hexane.
  - (i) The landfill owner or operator shall recalculate the NMOC mass emission rate using the equations provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using the average NMOC concentration from the collected samples instead of the default value in the equation provided in paragraph (a)(1) of this section.
  - (ii) If the resulting mass emission rate calculated using the site-specific NMOC concentration is equal to or greater than 50 megagrams per year, then the landfill owner or operator shall either comply with § 60.752(b)(2), or determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in paragraph (a)(4) of this section.

(Rule 1200-3-7-.07, continued)

- (iii) If the resulting NMOC mass emission rate is less than 50 megagrams per year, the owner or operator shall submit a periodic estimate of the emission rate report as provided in § 60.757(b)(1) and retest the site-specific NMOC concentration every 5 years using the methods specified in this section.
- (4) Tier 3. The site-specific methane generation rate constant shall be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator shall estimate the NMOC mass emission rate using equations in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using a site-specific methane generation rate constant  $k$ , and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator shall compare the resulting NMOC mass emission rate to the standard of 50 megagrams per year.
  - (i) If the NMOC mass emission rate as calculated using the site-specific methane generation rate and concentration of NMOC is equal to or greater than 50 megagrams per year, the owner or operator shall comply with § 60.752(b)(2).
  - (ii) If the NMOC mass emission rate is less than 50 megagrams per year, then the owner or operator shall submit a periodic emission rate report as provided in § 60.757(b)(1) and shall recalculate the NMOC mass emission rate annually, as provided in § 60.757(b)(1) using the equations in paragraph (a)(1) of this section and using the site-specific methane generation rate constant and NMOC concentration obtained in paragraph (a)(3) of this section. The calculation of the methane generation rate constant is performed only once, and the value obtained is used in all subsequent annual NMOC emission rate calculations.
- (5) The owner or operator may use other methods to determine the NMOC concentration or a site-specific  $k$  as an alternative to the methods required in paragraphs (a)(3) and (a)(4) of this section if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).
- (b) After the installation of a collection and control system in compliance with § 60.755, the owner or operator shall calculate the NMOC emission rate for purposes of determining when the system can be removed as provided in § 60.752(b)(2)(v), using the following equation:

$$M_{\text{NMOC}} = 1.89 \times 10^{-3} Q_{\text{LFG}} C_{\text{NMOC}}$$

where,

$M_{\text{NMOC}}$  = mass emission rate of NMOC, megagrams per year  
 $Q_{\text{LFG}}$  = flow rate of landfill gas, cubic meters per minute  
 $C_{\text{NMOC}}$  = NMOC concentration, parts per million by volume as hexane

- (1) The flow rate of landfill gas,  $Q_{\text{LFG}}$ , shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of appendix A of this part.
- (2) The average NMOC concentration,  $C_{\text{NMOC}}$ , shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission

(Rule 1200-3-7-.07, continued)

Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C NMOC as carbon to C<sub>NMOC</sub> as hexane.

- (3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).
- (c) The owner or operator of each MSW landfill subject to the provisions of this subpart shall estimate the NMOC emission rate for comparison to the PSD major source and significance levels in §§ 51.166 or 52.21 of this chapter using AP-42 or other approved measurement procedures. If a collection system, which complies with the provisions in § 60.752(b)(2) is already installed, the owner or operator shall estimate the NMOC emission rate using the procedures provided in paragraph (b) of this section.
- (d) For the performance test required in § 60.752(b)(2)(iii)(B), Method 25 or Method 18 of appendix A of this part shall be used to determine compliance with 98 weight-percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 60.752(b)(2)(i)(B). If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The following equation shall be used to calculate efficiency:

$$\text{Control Efficiency} = (\text{NMOC}_{\text{in}} - \text{NMOC}_{\text{out}}) / (\text{NMOC}_{\text{in}})$$

where,

NMOC<sub>in</sub> = mass of NMOC entering control device

NMOC<sub>out</sub> = mass of NMOC exiting control device

#### §60.755 Compliance provisions.

- (a) Except as provided in § 60.752(b)(2)(i)(B), the specified methods in paragraphs (a)(1) through (a)(6) of this section shall be used to determine whether the gas collection system is in compliance with § 60.752(b)(2)(ii).
- (1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.752(b)(2)(ii)(A)(1), one of the following equations shall be used. The k and L<sub>0</sub> kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 60.754(a)(4), the value of k determined from the test shall be used. A value of no more than 15 years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

- (i) For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_0 R (e^{-k_c} - e^{-kt})$$

where,

Q<sub>m</sub> = maximum expected gas generation flow rate, cubic meters per year

(Rule 1200-3-7-.07, continued)

- $L_o$  = methane generation potential, cubic meters per megagram solid waste  
 $R$  = average annual acceptance rate, megagrams per year  
 $k$  = methane generation rate constant, year<sup>-1</sup>  
 $t$  = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure,  $t$  is the age of the landfill at installation, years  
 $c$  = time since closure, years (for an active landfill  $c=0$  and  $e^{-kc}=1$ )

(ii) For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^n 2kL_o M_i (e^{-kt_i})$$

where,

- $Q_M$  = maximum expected gas generation flow rate, cubic meters per year  
 $k$  = methane generation rate constant, year<sup>-1</sup>  
 $L_o$  = methane generation potential, cubic meters per megagram solid waste  
 $M_i$  = mass of solid waste in the  $i^{\text{th}}$  section, megagrams  
 $t_i$  = age of the  $i^{\text{th}}$  section, years

- (iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in paragraphs (a)(1)(i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in paragraphs (a)(1)(i) or (ii) or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.
- (2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.752(b)(2)(ii)(A)(2), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.
  - (3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under § 60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.
  - (4) Owners or operators are not required to install additional wells as required in paragraph (a)(3) of this section during the first 180 days after gas collection system start-up.
  - (5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as

(Rule 1200-3-7-.07, continued)

provided in § 60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

- (6) An owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(ii)(A)(4) through the use of a collection system not conforming to the specifications provided in § 60.759 shall provide information satisfactory to the Administrator as specified in § 60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled.
- (b) For purposes of compliance with § 60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in § 60.752(b)(2)(i). Each well shall be installed within 60 days of the date in which the initial solid waste has been in place for a period of:
  - (1) 5 years or more if active; or
  - (2) 2 years or more if closed or at final grade;.
- (c) The following procedures shall be used for compliance with the surface methane operational standard as provided in § 60.753(d).
  - (1) After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a serpentine pattern spaced 30 meters apart (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.
  - (2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.
  - (3) Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A of this part, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
  - (4) Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4)(i) through (v) of this section shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.753(d).
    - (i) The location of each monitored exceedance shall be marked and the location recorded.
    - (ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.
    - (iii) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance

(Rule 1200-3-7-.07, continued)

for the same location, the action specified in paragraph (c)(4)(v) of this section shall be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) has been taken.

- (iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this section shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) shall be taken.
  - (v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.
- (5) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.
- (d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:
  - (1) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that "methane" shall replace all references to VOC.
  - (2) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.
  - (3) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part shall be used.
  - (4) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey.
- (e) The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.

§ 60.756 Monitoring of operations.

Except as provided in § 60.752(b)(2)(i)(B),

- (a) Each owner or operator seeking to comply with § 60.752(b)(2)(ii)(A) for an active gas collection system shall install a sampling port and a thermometer or other temperature measuring device at each wellhead and:

(Rule 1200-3-7-.07, continued)

- (1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.755(a)(3); and
  - (2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in § 60.755(a)(5); and
  - (3) Monitor temperature of the landfill gas on a monthly basis as provided in § 60.755(a)(5).
- (b) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an enclosed combustor shall calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment:
  - (1) A temperature monitoring device equipped with a continuous recorder and having an accuracy of  $\pm 1$  percent of the temperature being measured expressed in degrees Celsius or  $\pm 0.5$  °C, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity greater than 44 megawatts.
  - (2) A gas flow rate measuring device that provides a measurement of gas flow to or bypass of the control device. The owner or operator shall either:
    - (i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or
    - (ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.
- (c) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an open flare shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:
  - (1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.
  - (2) A device that records flow to or bypass of the flare. The owner or operator shall either:
    - (i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or
    - (ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.
- (d) Each owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(iii) using a device other than an open flare or an enclosed combustor shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator shall review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(Rule 1200-3-7-.07, continued)

- (e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 60.759 or seeking to monitor alternative parameters to those required by § 60.753 through § 60.756 shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.
- (f) Each owner or operator seeking to demonstrate compliance with § 60.755(c), shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in § 60.755(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

§ 60.757 Reporting requirements.

Except as provided in § 60.752(b)(2)(i)(B),

- (a) Each owner or operator subject to the requirements of this subpart shall submit an initial design capacity report to the Administrator.
  - (1) The initial design capacity report shall fulfill the requirements of the notification of the date construction is commenced as required under § 60.7(a)(1) and shall be submitted no later than the earliest day from the following:
    - (i) 90 days of the issuance of the State, Local, Tribal, or RCRA construction or operating permit, or
    - (ii) 30 days of the date of construction or reconstruction as defined under § 60.15, or
    - (iii) 30 days of the initial acceptance of solid waste.
  - (2) The initial design capacity report shall contain the following information:
    - (i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the provisions of the State, local, Tribal, or RCRA construction or operating permit;
    - (ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the State or local construction or RCRA permit, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity shall be calculated using good engineering practices. The calculations shall be provided, along with such parameters as depth of solid waste, solid waste acceptance rate, and compaction practices as part of the report. The State, Tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.
  - (3) An amended design capacity report shall be submitted to the Administrator providing notification of any increase in the design capacity of the landfill, whether the increase results from an increase in the permitted area or depth of the landfill, a change in the operating procedures, or any other means which results in an increase in the maximum design capacity of the landfill above 2.5 million megagrams or



(Rule 1200-3-7-.07, continued)

2.5 million cubic meters. The amended design capacity report shall be submitted within 90 days of the issuance of an amended construction or operating permit, or the placement of waste in additional land, or the change in operating procedures which will result in an increase in maximum design capacity, whichever occurs first.

- (b) Each owner or operator subject to the requirements of this subpart shall submit an NMOC emission rate report to the Administrator initially and annually thereafter, except as provided for in paragraphs (b)(1)(ii) or (b)(3) of this section. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate.
  - (1) The NMOC emission rate report shall contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 60.754(a) or (b), as applicable.
    - (i) The initial NMOC emission rate report shall be submitted within 90 days of the date waste acceptance commences and may be combined with the initial design capacity report required in paragraph (a) of this section. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (b)(1)(ii) and (b)(3) of this section.
    - (ii) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 50 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based shall be provided to the Administrator. This estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to the Administrator. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.
  - (2) The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.
  - (3) Each owner or operator subject to the requirements of this subpart is exempted from the requirements of paragraphs (b)(1) and (2) of this section, after the installation of a collection and control system in compliance with § 60.752(b)(2), during such time as the collection and control system is in operation and in compliance with § § 60.753 and 60.755.
- (c) Each owner or operator subject to the provisions of § 60.752(b)(2)(i) shall submit a collection and control system design plan to the Administrator within 1 year of the first report, required under paragraph (b) of this section, in which the emission rate exceeds 50 megagrams per year, except as follows:
  - (1) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.754(a)(3) and the resulting rate is less than 50 megagrams per year, annual periodic reporting shall be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 50 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, shall be submitted within 180 days of the first calculated exceedance of 50 megagrams per year.

(Rule 1200-3-7-.07, continued)

- (2) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant (k), as provided in Tier 3 in § 60.754(a)(4), and the resulting NMOC emission rate is less than 50 Mg/yr, annual periodic reporting shall be resumed. The resulting site-specific methane generation rate constant (k) shall be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.754(a)(4) and the resulting site-specific methane generation rate constant (k) shall be submitted to the Administrator within 1 year of the first calculated emission rate exceeding 50 megagrams per year.
- (d) Each owner or operator of a controlled landfill shall submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of § 258.60 of this title. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4).
- (e) Each owner or operator of a controlled landfill shall submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.
  - (1) The equipment removal report shall contain all of the following items:
    - (i) A copy of the closure report submitted in accordance with paragraph (d) of this section;
    - (ii) A copy of the initial performance test report demonstrating that the 15 year minimum control period has expired; and
    - (iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.
  - (2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 60.752(b)(2)(v) have been met.
- (f) Each owner or operator of a landfill seeking to comply with § 60.752(b)(2) using an active collection system designed in accordance with § 60.752(b)(2)(ii) shall submit to the Administrator annual reports of the recorded information in (f)(1) through (f)(6) of this paragraph. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under § 60.8. For enclosed combustion devices and flares, reportable exceedances are defined under § 60.758(c).
  - (1) Value and length of time for exceedance of applicable parameters monitored under § 60.756(a), (b), (c), and (d).
  - (2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified under § 60.756.
  - (3) Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating.
  - (4) All periods when the collection system was not operating in excess of 5 days.

(Rule 1200-3-7-.07, continued)

- (5) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.753(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month.
- (6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (a)(3), (b), and (c)(4) of § 60.755.
- (g) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall include the following information with the initial performance test report required under § 60.8:
  - (1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;
  - (2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
  - (3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
  - (4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area; and
  - (5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
  - (6) The provisions for the control of off-site migration.

§ 60.758 Recordkeeping requirements.

Except as provided in § 60.752(b)(2)(i)(B),

- (a) Each owner or operator of an MSW landfill subject to the provisions of § 60.752(b) shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.
- (b) Each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs (b)(1) through (b)(4) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.
  - (1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(ii):
    - (i) The maximum expected gas generation flow rate as calculated in § 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.

(Rule 1200-3-7-.07, continued)

- (ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.759(a)(1).
- (2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity greater than 44 megawatts:
  - (i) The average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test.
  - (ii) The percent reduction of NMOC determined as specified in § 60.752(b)(2)(iii)(B) achieved by the control device.
- (3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(B)(1) through use of a boiler or process heater of any size: a description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.
- (4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(A) through use of an open flare, the flare type (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.
- (c) Each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
  - (1) The following constitute exceedances that shall be recorded and reported under § 60.757(f):
    - (i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal unit per hour) or greater, all 3-hour periods of operation during which the average combustion temperature was more than 28 °C below the average combustion temperature during the most recent performance test at which compliance with § 60.752(b)(2)(iii) was determined.
    - (ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3)(i) of this section.
  - (2) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 60.756.
  - (3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 60.752(b)(2)(iii) shall keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of

(Rule 1200-3-7-.07, continued)

steam use, fuel use, or monitoring data collected pursuant to other State, local, Tribal, or Federal regulatory requirements.)

- (4) Each owner or operator seeking to comply with the provisions of this subpart by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 60.756(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.
- (d) Each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.
  - (1) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.755(b).
  - (2) Each owner or operator subject to the provisions of this subpart shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.759(a)(3)(ii).
- (e) Each owner or operator subject to the provisions of this subpart shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

§ 60.759 Specifications for active collection systems.

- (a) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Administrator as provided in § 60.752(b)(2)(i)(C) and (D):
  - (1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.
  - (2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.
  - (3) The placement of gas collection devices determined in paragraph (a)(1) of this section shall control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (a)(3)(ii) of this section.
    - (i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the Administrator upon request.

(Rule 1200-3-7-.07, continued)

- (ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the following equation:

$$Q_i = 2 k L_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9})$$

where,

$Q_i$  = NMOC emission rate from the  $i^{\text{th}}$  section, megagrams per year

$k$  = methane generation rate constant, year<sup>-1</sup>

$L_o$  = methane generation potential, cubic meters per megagram solid waste

$M_i$  = mass of the degradable solid waste in the  $i^{\text{th}}$  section, megagram

$t_i$  = age of the solid waste in the  $i^{\text{th}}$  section, years

$C_{NMOC}$  = concentration of nonmethane organic compounds, parts per million by volume

$3.6 \times 10^{-9}$  = conversion factor

The values for  $k$ ,  $L_o$ , and  $C_{NMOC}$  determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence. If field testing has not been performed, the default values for  $k$ ,  $L_o$  and  $C_{NMOC}$  provided in § 60.754(a)(1) shall be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

- (b) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures:
- (1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration.
  - (2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(Rule 1200-3-7-.07, continued)

- (3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.
- (c) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with § 60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:
  - (1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section shall be used.
  - (2) For new collection systems, the maximum flow rate shall be in accordance with § 60.755(a)(1).

**Authority:** T.C.A. §§68-201-105 and 4-5-202. **Administrative History:** Original rule certified June 7, 1974. Amendment filed December 8, 1981; effective January 22, 1982. Amendment filed September 22, 1988; effective November 6, 1988. Amendment filed March 5, 1993; effective April 19, 1993. Amendment filed October 15, 1998; effective December 28, 1998.

#### 1200-3-7-.08 SPECIFIC PROCESS EMISSION STANDARDS.

- (1) Existing Ferrous Jobbing Cupolas

No later than August 9, 1973, the maximum particulate emission rate from existing ferrous jobbing cupolas shall be as given in Table 3.

TABLE 3 ALLOWABLE RATE OF PARTICULATE EMISSION  
BASED ON PROCESS WEIGHT RATE EXISTING FERROUS JOBBING CUPOLAS

Process Weight (lb/hr)	Maximum Weight Discharge (lb/hr)
1,000	3.05
2,000	4.70
3,000	6.35
4,000	8.00
5,000	9.58
6,000	11.30
7,000	12.90
8,000	14.30
9,000	15.50
10,000	16.65
12,000	18.70
16,000	21.60
18,000	23.40
20,000	25.10

The emission rate for a process weight intermediate to those shown in the Table shall be determined by linear interpolation.

(Rule 1200-3-7-.08, continued)

(2) Emissions From Nitric Acid Plants

(a) Existing Nitric Acid Plants

After July 1, 1975, no person shall cause, suffer, allow, or permit the emission into the air of nitrogen oxides from any nitric acid plant under construction or in operation prior to April 3, 1972, which are:

1. In excess of 5.5 lbs per ton of acid produced, maximum 2 hour average, expressed as NO<sub>2</sub>; or
2. 400 ppm (0.04% by volume dry basis) of nitrogen oxides, measured as NO<sub>2</sub>, whichever is the more restrictive.

(3) New and Existing Cotton Gins

(a) For the purpose of this paragraph, the following definitions apply:

1. "Cotton Gin" means any facility or plant which removes seed, lint, and trash from raw cotton and bales the lint cotton for further processing. All individual pieces of equipment located at a cotton gin shall be considered as being a single process emission source.
2. "Cotton Gin Site or Gin Site" means the land upon which a cotton gin is located and all contiguous land having an identical ownership.
3. "High Efficiency Cyclone" means any cyclone type collector of the 2D-2D or 1D-3D configuration. The 2D-2D design for small diameter cyclones is set forth in Agricultural Handbook 503, U.S. Dept. of Agriculture, Cotton Ginners Handbook, 1977 Edition, pages 81-84. The 1D-3D design for small diameter cyclones is the Texas A & M University long-cone cyclone design. Design specifics of this type of cyclone are set forth in Figure 6 of the article titled, "Air Utilization", by E.P. Columbus, which was presented at the Cotton Ginners Shortcourse which was held on July 27-31, 1987 at Stoneville, Mississippi.
4. "Low Pressure Exhausts" means the exhaust air systems at a cotton gin which handles air from the cotton lint handling system and battery condenser.
5. "High Pressure Exhausts" means all other exhaust air systems located at a cotton gin which are not defined as "low pressure exhausts".
6. "Dust House" means a gravity settling chamber utilized for the control of particulate emissions from a cotton gin and meeting the specifications set forth in Agriculture Handbook 260, U.S. Dept. of Agriculture, Handbook for Cotton Ginners, 1964 Edition, page 93.

(b) The following conditions apply to owners and operators of cotton gins subject to the provisions of this paragraph:

1. Reserved.
2. The owner or operator of a cotton gin which was in operation or under construction on or prior to July 16, 1990, shall meet the standards set forth in Table 4 of rule 1200-3-7-.08 no later than July 1, 1991.



(Rule 1200-3-7-.08, continued)

3. The owner or operator of a cotton gin for which construction begins after July 16, 1990 shall meet the standards set forth in Table 4 at the time the cotton gin commences operation.
  4. In lieu of demonstrating compliance with the applicable emission standard contained in Table 4 of this rule the following control devices may be utilized:
    - (i) for emission control from low pressure exhausts, the use of screens with a mesh size of 80 by 80 or finer, or the use of perforated condenser drums with holes not exceeding .045 inches in diameter, or the use of a dust house.
    - (ii) for emission control from high pressure exhausts the use of high efficiency cyclones shall be deemed as demonstrating compliance.
  5. If compliance with the emission standard specified in Table 4 is required, then the testing methodology to be utilized shall be that specified in Chapter 2 of the Department of Health and Environment's Source Sampling Manual (dated December 10, 1987).
  6. Effective July 1, 1991, the burning of cotton gin waste at the gin site in a wigwam or any other type of enclosed burner shall be prohibited.
- (c) The allowable particulate emission standards for new and existing cotton gins shall be determined by Table 4.

TABLE 4 ALLOWABLE RATE OF PARTICULATE EMISSIONS  
BASED ON PROCESS WEIGHT RATE FOR NEW AND EXISTING COTTON GINS

Process Weight Rate	Rate of Emission	Process Weight Rate	Rate of Emission
Lb/Hr	Lb/Hr	Lb/Hr	Lb/Hr
1,000	1.6	9,000	13.7
1,500	2.4	10,000	15.2
2,000	3.1	12,000	18.2
2,500	3.9	14,000	21.2
3,000	4.7	16,000	24.2
3,500	5.4	18,000	27.2
4,000	6.2	20,000	30.1
5,000	7.7	30,000	44.9
6,000	9.2	40,000	59.7
7,000	10.7	50,000	64.0
8,000	12.2	60,000 or more	67.4

The allowable emission rate for a cotton gin with process weight rates intermediate to those shown in Table 4 shall be determined by linear interpolation.

(NOTE: All publications mentioned in paragraph 3 of this rule are available upon request by writing to:

Tennessee Division of Air Pollution Control

(Rule 1200-3-7-.08, continued)

401 Church Street  
9th Floor, L & C Annex  
Nashville, Tennessee 37243-1531

(A reasonable charge may apply for copying said materials.)

(4) New and existing Kraft Mills.

The owner or operator of a kraft mill on which construction begins after January 1, 1973, shall meet the standards listed in subparagraphs (a), (b), and (c) of this paragraph at the time of operation of such mill commences. After August 9, 1973, no person shall cause, suffer, allow or permit particulate emissions from a kraft mill under construction or operation prior to September 11, 1980, in excess of the standard chosen in 1200-3-7-.02(1) or 1200-3-7-.02(2) provided, however, that after July 1, 1977, said emissions are as follows:

- (a) Particulate matter from all recovery stacks shall not exceed three pounds per ton of equivalent air-dried kraft pulp.
- (b) Particulate matter from all lime kilns shall not exceed one pound per ton of equivalent air dried kraft pulp.
- (c) Particulate matter from all smelt tanks shall not exceed on-half pound per ton of equivalent air dried kraft pulp.

(5) Existing Asphalt Plants.

After August 9, 1973, no person shall cause, suffer, allow or permit the discharge of particulate emissions from any asphalt plant under construction or in operation prior to April 3, 1972, in excess of the standard selected in accordance with the provisions of 1200-3-7-.02(1) or 1200-3-7-.02(2). It is expressly provided that no later than July 1, 1975, these emissions shall not be in excess of the standards set forth in Table 1 of chapter 1200-3-7, entitled "Existing Process Emission Sources: Allowable Rate of Emission Based on Process Weight Rate." It is further stipulated that after that date, the rate of emission for existing asphalt plants with a process weight rate in excess of 200,000 pounds (100 tons) per hour shall not exceed 51.2 pounds per hour. Asphalt plants which are relocated more than 1.0 km from the previous position and did not receive a construction permit prior to November 6, 1988, shall not be allowed to emit more than the greater of the actual emissions at its previous location or the allowable emissions for a new asphalt plant.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule certified June 7, 1974; effective June 16, 1974. Amendment filed January 10, 1977; effective June 16, 1974. Amendment filed July 28, 1980; effective September 11, 1980. Amendment filed September 21, 1988; effective November 6, 1988. Amendment filed June 1, 1990; effective July 16, 1990.

**1200-3-7-.09 SULFURIC ACID MIST.**

- (1) Sulfuric acid plants of any type commenced on or before April 3, 1972, must not emit more than 0.500 pounds of sulfuric acid mist per ton of 100% H<sub>2</sub>SO<sub>4</sub> produced, maximum one hour average expressed as H<sub>2</sub>SO<sub>4</sub>.
- (2) Sulfuric acid plants of any type commenced after April 3, 1972, must not emit more than 0.150 pounds of sulfuric acid mist per ton of 100% H<sub>2</sub>SO<sub>4</sub> produced, maximum one hour average expressed as H<sub>2</sub>SO<sub>4</sub>.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule effective February 9, 1977.

**1200-3-7-.10 GRAIN LOADING LIMIT FOR CERTAIN EXISTING SOURCES.**

- (1) A certificate of validation shall be issued by the Technical Secretary to air contaminant sources meeting the conditions of paragraphs (2) and (3) below. The applicable standard for a source with a certificate of validation is 1.0 grains per dry standard cubic foot of stack gases corrected to 70°F and 1 atmosphere in lieu of paragraph 1200-3-7-.04(2).
- (2) The owner or operator of the air contaminant source must demonstrate to the satisfaction of the Technical Secretary that the following conditions exist:
  - (a) The air contaminant source was commenced before April 3, 1972; and no modification has been made to the source since that date.
  - (b) The air contaminant source meets all applicable emission standards outside of paragraph 1200-3-7-.04(2). Demonstration of this compliance with other regulations will require as a minimum an acceptable stack test report for particulate matter mass emissions (lbs/hr.) and verification of meeting the requirements of chapter 1200-3-5.
  - (c) The particulate matter ambient air quality standards are being met in the vicinity of the air contaminant source, and no deterioration in air quality will result from the granting of a certificate of validation. The Technical Secretary may require this achievement of air quality to be demonstrated.
  - (d) A fee of five hundred dollars (\$500) has been paid to the Department of Environment and Conservation to cover the cost of review of the request for the certificate of validation.
  - (e) The owner or operator shall submit an engineering report demonstrating that the investment cost of attaining 0.25 grains per dry standard cubic foot (gr/dscf) will exceed \$50,000 per pound of particulate matter emissions prevented from entering the atmosphere per hour; or demonstrate attainment of 0.25 gr/dscf is technically unfeasible. The investment cost per pound per hour shall be calculated by the following formula:

$$\text{Investment Cost per lb/hr} = \frac{\text{Capital Cost}}{(\text{Present Grain Loading/DSCF} - .25 \text{ gr/DSCF}) \left( \frac{\text{DSCF/hr}}{7000 \text{ gr/lb}} \right)}$$

where:

DSCF = dry standard cubic foot

capital cost = expenditures covering the procurement and erection of air pollution control systems or necessary process modifications.

- (f) The particulate matter emissions from the process emission source do not exceed 100 lbs/hr.
- (3) The owner or operator of the air contaminant source must, in addition:
  - (a) Post on the operating premises the certificate of validation.
  - (b) Keep the air pollution control equipment in good operating condition and utilize said equipment at all times.
- (4) Upon receipt of information by the Technical Secretary that any of the requirements of Paragraph (2) have been violated and any requirement of Paragraph (3) has been violated three times in any two year period, the Technical Secretary shall call a show cause meeting pursuant to T.C.A. 68-25-107(8) to inquire into the alleged violations. After hearing sufficient proof and making findings of fact, the Technical Secretary shall revoke the certificate of validation previously granted to the offending air

(Rule 1200-3-7-.11, continued)

contaminant source. After the certificate of validation has been revoked, the offending source shall comply with 1200-3-7-.04(2) as expeditiously as possible in a compliance schedule contained in an administrative order.

- (5) After granting of a construction permit for the modification of an air contaminant source for which a certificate of validation has been issued, the certificate of validation shall become void on the date of expiration of the construction permit and Paragraph 1200-3-7-.04(2) shall apply.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule effective March 21, 1979.

#### **1200-3-7-.11 CARBON MONOXIDE, ELECTRIC ARC FURNACES.**

Electric arc furnaces used in producing iron or steel and located in Knox County shall emit no more than 18.0 pounds of carbon monoxide per ton of metal produced, one hour average.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule filed September 10, 1977; effective October 25, 1979.

#### **1200-3-7-.12 CARBON MONOXIDE, CATALYTIC CRACKING UNITS.**

After July 1, 1980, all catalytic cracking units at petroleum refineries located in Shelby County must not discharge to the atmosphere carbon monoxide in excess of 0.050 per cent by volume.

**Authority:** T.C.A. §§68-25-105 and 4-5-202. **Administrative History:** Original rule filed November 8, 1981; effective January 22, 1982.